

### **REMARKS**

This Amendment is filed in response to the Office Action dated November 19, 2003. Applicant first notes with appreciation the Examiner's thorough examination of the application as evidenced by the Office Action. In response to the Office Action, Applicant has amended Claims 43 and 48 to clear up antecedent basis issues. Applicants have not amended the claims substantively, as Applicants believe that the claims as originally presented are patentable over the cited references. As such, Applicants respectfully request reconsideration of the application in light of the remarks presented below.

#### **I. Request for Telephonic Interview**

Applicant's counsel hereby requests a telephonic interview after the Examiner has had an opportunity to review the remarks provided below. Such an interview would be brief and would focus only on the current rejections and cite references. Applicant's counsel Kevin Ransom can be reached at 704-444-1017. Applicant has submitted a formal interview request with this Response.

#### **II. Completeness**

Applicants note that the Office Action raises a plurality of issues. Applicants have attempted to discern all issues and respond accordingly. If the Examiner notes an issue not addressed by Applicants, Applicants request that this be raised in the interview, so that Applicants' counsel may respond appropriately.

#### **III. Confirmation of Species Selection**

On page 2, the Office Action states that Applicants did not explicitly include an identification of the species that were selected in the Response to Restriction Requirement. Further, the Office Action states that "it is reasonably clear that applicant intended to elect the species wherein the release layer is selected from the group consisting of polyimide and parylene, and the species wherein the bump is gold." Applicants respectfully disagree.

Applicants believe that a proper election of species was made in the Response to Restriction Requirement. Specifically, Applicants stated “Applicants provisionally elect with traverse to prosecute Claims 25-28, 31, 32, 36, 39, and 42-48. This election includes claims directed to a release layer being made of polyimide or parylene and the bump being formed of solder.” Although, Applicants traversed the restriction, Applicants intended to indicate that the species were for a release layer of polyimide or parylene and the a solder bump formed of solder.

The Office Action at the top of page 2 states that the selected species for the bump was gold, but at the bottom of page 2 states that the selected species is solder. Applicants would like to clarify that the selected species is solder.

## **VI. The Claims Are Definite**

On pages 3-9, the Office Action rejected the claims for various reasons under 35 U.S.C. § 112. Applicants have dealt with each of these issues in turn below. Applicants note here that they believe that they have addressed all of these rejections. If the Examiner determines that Applicants have not addressed one or more points, Applicants request that the Examiner contact Applicants’ counsel Kevin Ransom at 704-444-1017.

### **A. Failure to Include Critical Feature in the Claims**

On page 3, the Office Action rejects Claims 25-28, 31, 32, 36, 39, and 43-48 under 35 U.S.C. § 112, first paragraph, as omitting a critical feature of the claims. Specifically, the Office Action points to page 12, lines 14-18 of the specification, which states that it is important to precisely control the adhesion characteristics at the interface between the release layer and the microbeam. The Office Action alleges that this is a critical feature and must be part of the claims. Applicants disagree with the rejection.

Applicants refer to MPEP § 2164.8(c), which state that a “feature which is taught as *critical* in the specification and is not recited in the claims should result in a rejection of the claims. [emphasis added]. Further, the section states that “broad language in the disclosure, including the abstract, omitting an allegedly critical feature, tends to rebut the argument of criticality.”

In this regard, Applicants note that the specification does not state that the feature is *critical*. Instead, it states that the feature is important. Further, at least the Abstract, does not mention that this feature is critical. While Applicants agree that it is important to control the adhesion between the release layer and the microbeam, it is not critical to the invention. The specification nowhere states such a criticality. As such, Applicants respectfully submit that this rejection is overcome.

### **B. Rejections Based on Adequacy of Written Description**

On pages 3-4, the Office Action rejects the claims alleging that there is inadequate description for the following recitations in the claims “carrier is a tape automated bonding (TAB) carrier,” “release layer formed from a material selected from the group consisting of polyimide and parylene,” and “release layer.” The Office Action argues that the application does not describe an actual reduction to practice of the claimed invention. Applicants again disagree.

Applicants note here that the specification describes an embodiment of the invention that uses a tungsten release layer. However, the specification does disclose that in an alternative embodiment, the release layer could be polyimide or parylene. Specifically, the specification states:

While the release layer 50 may be formed of tungsten, the release layer 50 may also be formed of a very thin oxidized metal layer or of a thin layer of polyimide or parylene. In addition, other metallic or non-metallic materials, such as spin-on oxide or spin-on glass coatings, may be used to form the release layer 50 so long as the release layer will adhere to the microbeams 52 very weakly without contaminating the underside of the microbeams 52 (so as to thereby avoid bonding difficulties that may result from microbeam surface contamination).

The polyimide material used to form the release layer 50 may be a liquid organic polyimide such as Pyralin PI-2570 from Dupont. The polyimide may be applied to the carrier 48 by a spin-on process as is commonly used for photoresist coatings in the semiconductor industry. Alternatively, the polyimide may be applied by such drop dispensing, spraying, or roller coating processes as are known in the art.

Alternatively, the microbeams 52 may be formed on a lift-off polyimide material soluble in a release solvent. In this approach, the release layer 50 is dissolved after

formation of the microbeams 52, thereby releasing the microbeams. Alternatively, the polyimide release layer may be removed from under the microbeams 52 by plasma etching of the polyimide with oxygen or with a reactive gas such as CF<sub>4</sub> as is known in the art.

Applicant notes that MPEP § 2163.II.A.2(a)(i)(C) states that if the invention has been set forth in terms of distinguishing identifying characteristics as evidenced by other descriptions of the invention that are sufficiently detailed to show that application was in possession of the claimed invention, then reduction to practice has been met. In this regard, the specification fully discloses an embodiment where the release layer is tungsten. The specification clearly illustrates, however, that parlene or polyimide may be use for the release layer. The question is whether Applicants had possession of the invention at the time. Applicants more than adequately disclose one embodiment of the invention, and along the way discloses how alternatives may be formed. Applicants thus respectfully submit that this rejection is overcome.

The Office Action also states that there is not sufficient written description describing a representative number of species concerning the term "release layer." Further, the Office Action alleges that the specification does not define sufficient properties to define composition of the genus. In this regard, the specification states:

The release layer 50 may be a thin layer of tungsten or other suitable material which may be deposited on a carrier to allow a conductive microbeam 52 to be formed via electroplating, other plating processes, or other material build-up processes as are known in the art. The release layer 50 preferably has the property of permitting the subsequent formation of conductive microbeams while adhering only very weakly to the microbeams. Microbeams 52 formed thereon may thereby subsequently be lifted from the release layer 50 with very little lifting force.

While the release layer 50 may be formed of tungsten, the release layer 50 may also be formed of a very thin oxidized metal layer or of a thin layer of polyimide or parylene. In addition, other metallic or non-metallic materials, such as spin-on oxide or spin-on glass coatings, may be used to form the release layer 50 so long as the release layer will adhere to the microbeams 52 very weakly without contaminating the underside of the microbeams 52 (so as to thereby avoid bonding difficulties that may result from microbeam surface contamination).

The specification clearly states what class of properties are needed of a material that would make up a release layer. Specifically, it states that the release layer must have a property of allowing a layer to be built thereon without adhering too strongly thereto. The specification then gives several examples of classes of materials that would meet this property, such as oxidized metal, oxide, glass, polyimide or parylene, etc. If this disclosure in the specification does not meet the requirements of disclosure for species and genus, then Applicants would like further instruction as to what would.

### **C. The Claims Are Definite**

The Office Action also rejects the term “release layer” as used in the claims. The Office Action alleges that it has been given a meaning in the specification that is repugnant to its usual meaning. The Office Action states that in the claims, the release layer is not used to prevent adhesion because it is bonded to the microbeam. Applicants disagree with this analysis. The term “release” by definition implies that something was first held and then released. If you never hold something, how can you release it? As used in the claims, the release layer holds the microbeam until it is etched away, at which time it “releases” the microbeam. Applicants’ dictionary defines release as to set free from confinement. This is the same way the term is used in the specification.

The Office Action rejects Claims 26 and 48 because of the recited term “tape automated bonding (TAB) carrier” is not recognized in the art as a defined term. Applicants disagree. Applicants performed a quick search on the USPTO patent database for the term “tape automated bonding carrier” and found four patents dating back to January 1986. Applicants searched “tape automated bonding (TAB) carrier” and found two more patents. Further Applicants performed a search on “tape automated bonding” and “carrier” and 1647 patents. These all indicate that the term is known in the art.

The Office Action rejects Claims 28, 39, and 43-46 alleging that the term “fan-out conductors” is not known in the art. Applicants performed a quick search on the USPTO patent database for the term “fan-out conductor” and found 7 patents. A search was also performed on

the term "fan out conductors" an 12 patents were returned. These all indicate that the term is known in the art.

The Office Action rejected Claim 43 for lack of antecedent basis for the term "conductor microbeams." Applicants have amended Claim 43 to resolve this issue.

The Office Action rejected Claim 48 for lack of antecedent basis for the term "said release." Applicants have amended Claim 48 to resolve this issue.

#### **V. The Claims Are Patentable**

On pages 9-19, the Office Action rejected the claims as either obvious in light of the Hatada reference by itself or in combination with either the Chen, Moore, or Little references. Applicant disagrees with these rejections. The Office Action states that it is inherent that the Pt and Pd layer disclosed in the Hatada reference is etchable and that if etched, the microbeams would be released. There is nothing in Hatada to teach or suggest that the Pt and Pd layers could be etched without destroying the microbeams also. Furthermore, there is nothing to teach or suggest that etching the Pt and Pd layers would actual release the beams in the structure disclosed in the Hatada reference. Therefore, at least one element of the independent claims is not met by the Hatada reference. Furthermore, neither the Chen, Moore, or Little reference aid in this regard. As such, Applicants respectfully submit that the claims of the application are patentable over the cited references.

#### **Conclusion**

In view of the amended claims and remarks presented above, it is respectfully submitted that all of the present claims of the application are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper.

However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

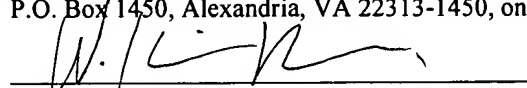


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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on March 19, 2004

  
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